Loudoun Co., VA RiskMAP Scoping & Kickoff Meeting

January 20, 2011

Initial Coordination Meeting

- Introduce project and project team
- Ensure all stakeholders understand project tasks and timeline
- Discuss priority areas for study
- Initiate risk assessment and mitigation planning discussions

FEMA Region III - Current DFIRM Status by County of Virginia

December 31, 2010

LEGEND

- Effective
- Preliminary
- In Progress

WV

MD

DE

KY

VA

NC

NC

Prepared by: Risk Assessment, Mapping, and Planning Partners, RSC III Team

0 20 40 80 120 160 Miles

Projection: Geographic NAD 83

Data Source: FEMA Sequencing Tool - FMPU

Virginia Map Status Summary

- Effective: 112 Counties & Independent Cities
- Preliminary: 21 Counties & Independent Cities
- In Progress: 2 (Scott & Smyth)
- Full Coastal Detailed Study in Progress effecting 13 Counties & Independent Cities

Loudoun County Current Flood Map Status

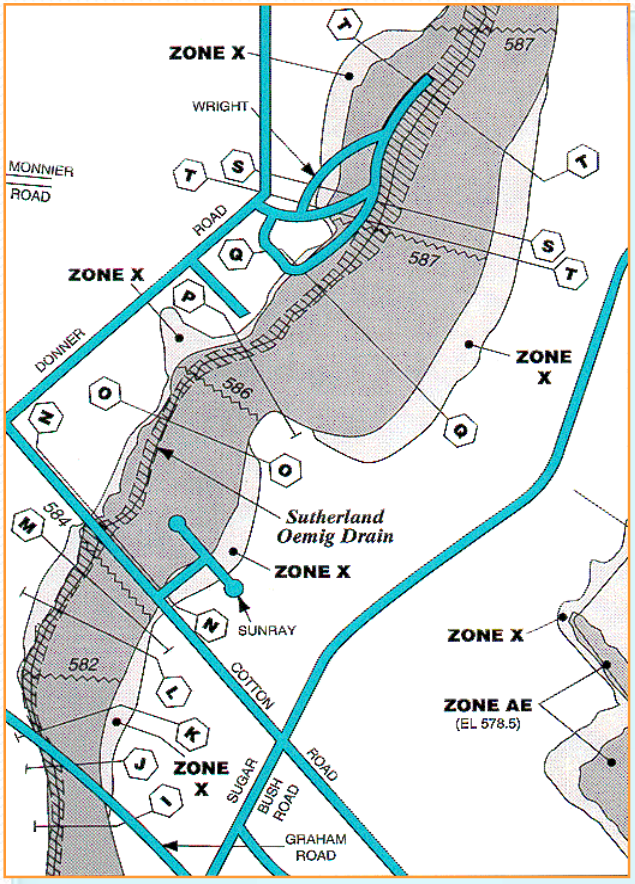
- Currently Effective as of July 5, 2001 and in Digital form
- Completed using the National Geodetic Vertical Datum NGVD 1929
- Created using 2, 5, and 10 foot contours acquired March 1971

Loudoun County Riverine Study

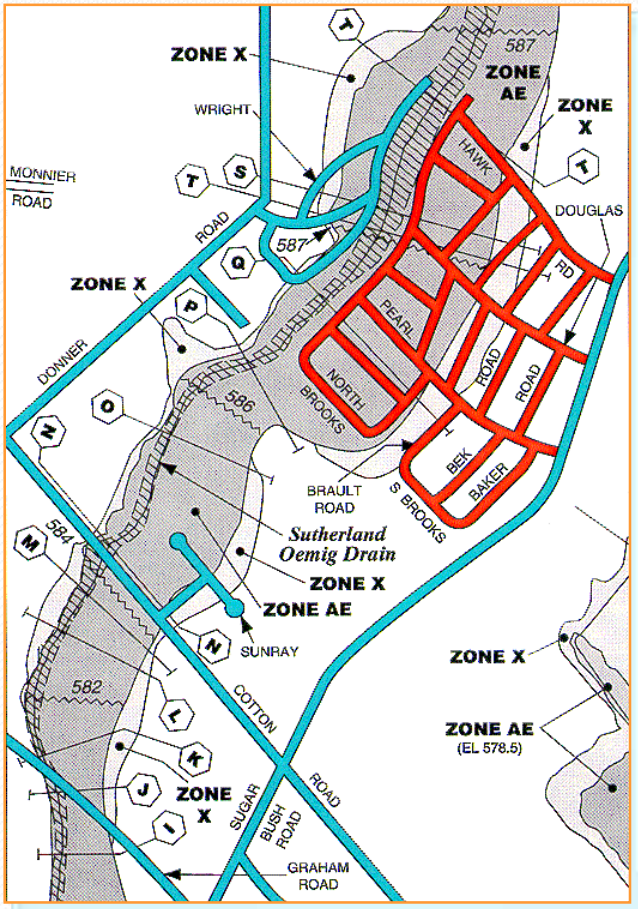
- Effective Study
  - Effective July 5, 2001
  - National Geodetic Vertical Datum (NGVD) 1929
  - Created using 2, 5, and 10 foot contours acquired March 1971
- Draft Riverine Study Scope
  - Redelineation approx. 290 miles
  - New Approximate Study approx. 578 miles
  - New Detail Study – Contingent on budget
  - Incorporate approx 17 LOMRs completed since 2001 study
  - Approximately 67 panels

Why Maps Need to be Updated

Old Base Maps



New Base Maps



Development creates new streets and alters road networks-impacts accuracy of map

Why Maps Need to be Updated

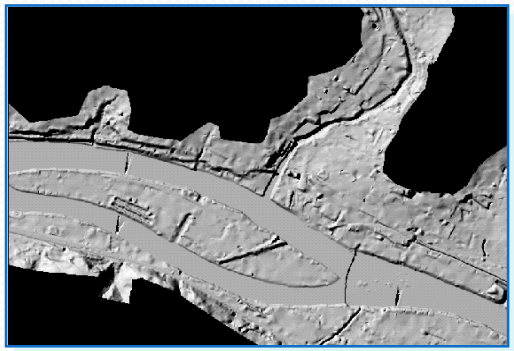
Underestimated floodplain before Map Modernization

Accurately Identified floodplain after Map Modernization

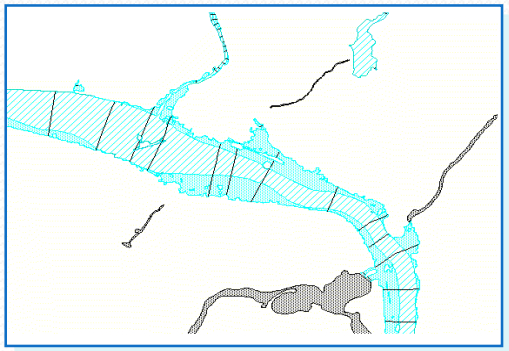
Flood hazard conditions are dynamic due to natural and man-made changes

Components of a Digital Flood Insurance Rate Map (FIRM)

Base



Topography



Flood Data

Standard Digital FIRM

- All digital FIRMs will contain certain standard features:
  - A base map that is distributed with the digital files
  - The features normally shown on a printed FIRM such as flood boundaries, BFEs, cross sections, bench marks, etc.
  - Electronic FIS text and profiles
  - Metadata

Base Maps

- Backdrop for digital FIRM floodplain features
  - May be used to compile floodplain features
  - Used to locate insured structures
- Standards require accuracy, currency, and distribution
- Community/State data is first choice
- USGS DOQs are second choice

Digital Topographic Data

- "Bare-earth" elevation data of the terrain, including underwater terrain:
  - Digitized Contour Lines
  - DEMs
  - DTMs
  - TINs
  - Breaklines
  - Cross Sections
  - Channel Bottom Profiles
- Do not include Digital Surface Models (DSMs) of treetops and rooftops

Digital Topographic Data

- 2 and 4 foot contours available
- Produced as part of the 2006-2007 ortho update by VGIN http://gisdata.virginia.gov/Portal/

- Are there updates available?

Hydrologic Modeling Data needs

- Dependent on engineering method to be used; typical need:
- Topographic data
- Land Use data
- Stream network
- New Hydrologic Analysis will be completed for the entire Middle Potamac-Catoctin HUC 8 Watershed. This includes calculation of peak flood discharges for the 10, 25, 50, and 100 year events using TR-55, TR-20, or HEC-HMS computer programs.

The Paradigm Shift: Map Mod to Risk MAP

- Map Modernization used increasingly-available technology to increase the quality, reliability, and availability of flood hazard maps and data
- It focused on digitizing maps to provide timely, accurate information to community planners

Risk MAP further enhances the maps, involves communities during the assessment and planning stages, and guides and encourages them to communicate risk to their constituents

What is RiskMAP?

- **Risk MAP is a combination of flood hazard mapping, risk assessment tools, and mitigation planning into one seamless program**
  - **Established in order to leverage the successes of Map Modernization and further enhance the usability and value of flood hazard mapping**
  - **Intended to encourage beneficial partnerships and innovative uses of flood hazard and risk assessment data in order to maximize flood loss reduction**

Loudoun County Risk Assessment Study

- Flood risk assessment quantifies the flood risk (probability times exposure).

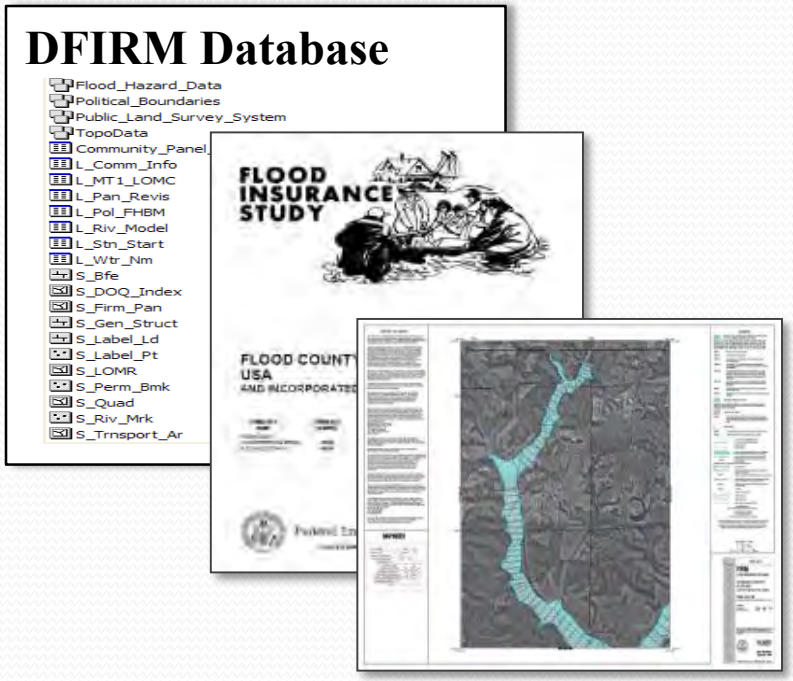
- Flood risk datasets and products will normally be created as companion products during the creation or revision of flood hazard analyses.

Loudoun County Risk Assessment Study Draft Scope

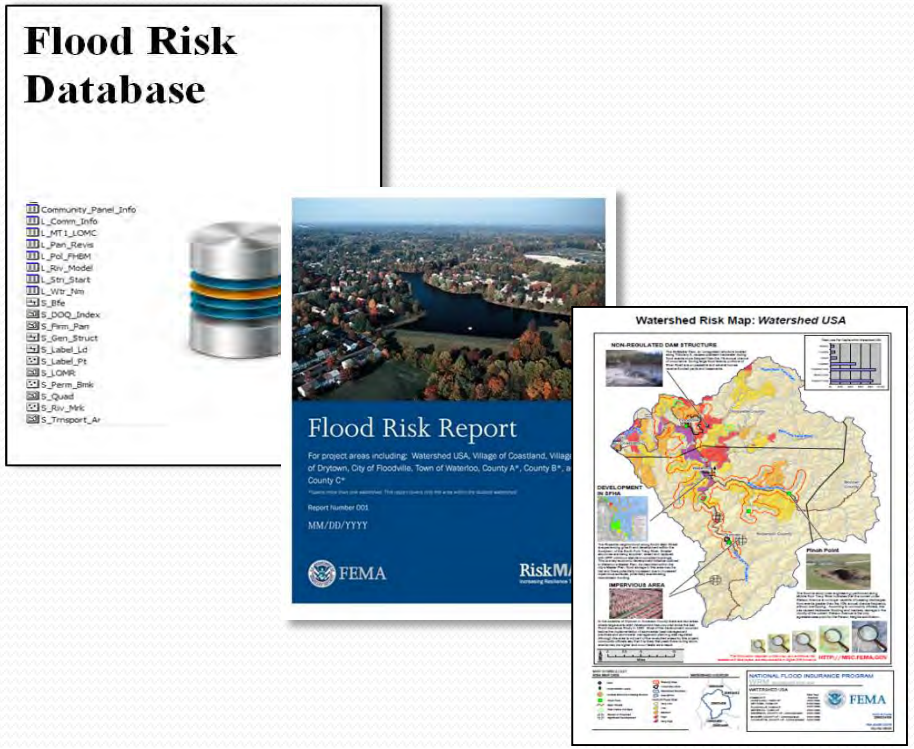
- Risk Assessment Base Products – Hazus Runs, Depth Grids, Changes Since Last FIRM Map.
- A Flood Risk Report and Database will be produced for the Middle Potomac-Catoctin HUC 8 watershed
- As funds allow: A la carte Risk Assessment Enhanced products. Probability Grids, Areas of Mitigation Interest, Velocity Grids, ect.

Program Products Comparisons

Traditional Regulatory Products



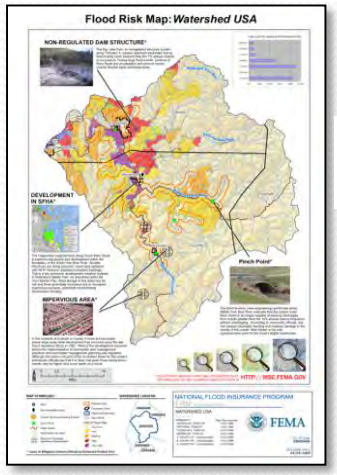
Non-Regulatory Products



Traditional products are regulatory and subject to statutory due-process requirements

Risk MAP products are non-regulatory and are not subject to statutory due-process requirements

Flood Risk Products and Data Model

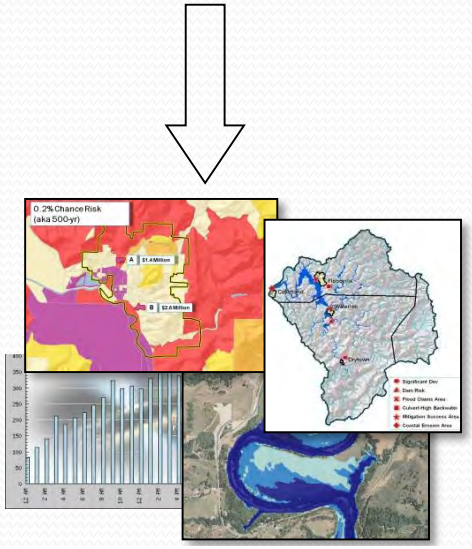


Flood Risk Map

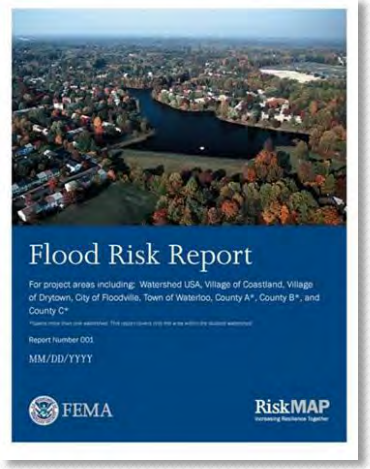
Flood Risk Database

Flood Risk Assessment Data
Flood Depth & Analysis Grids

Changes Since Last FIRM Data
Areas of Mitigation Interest



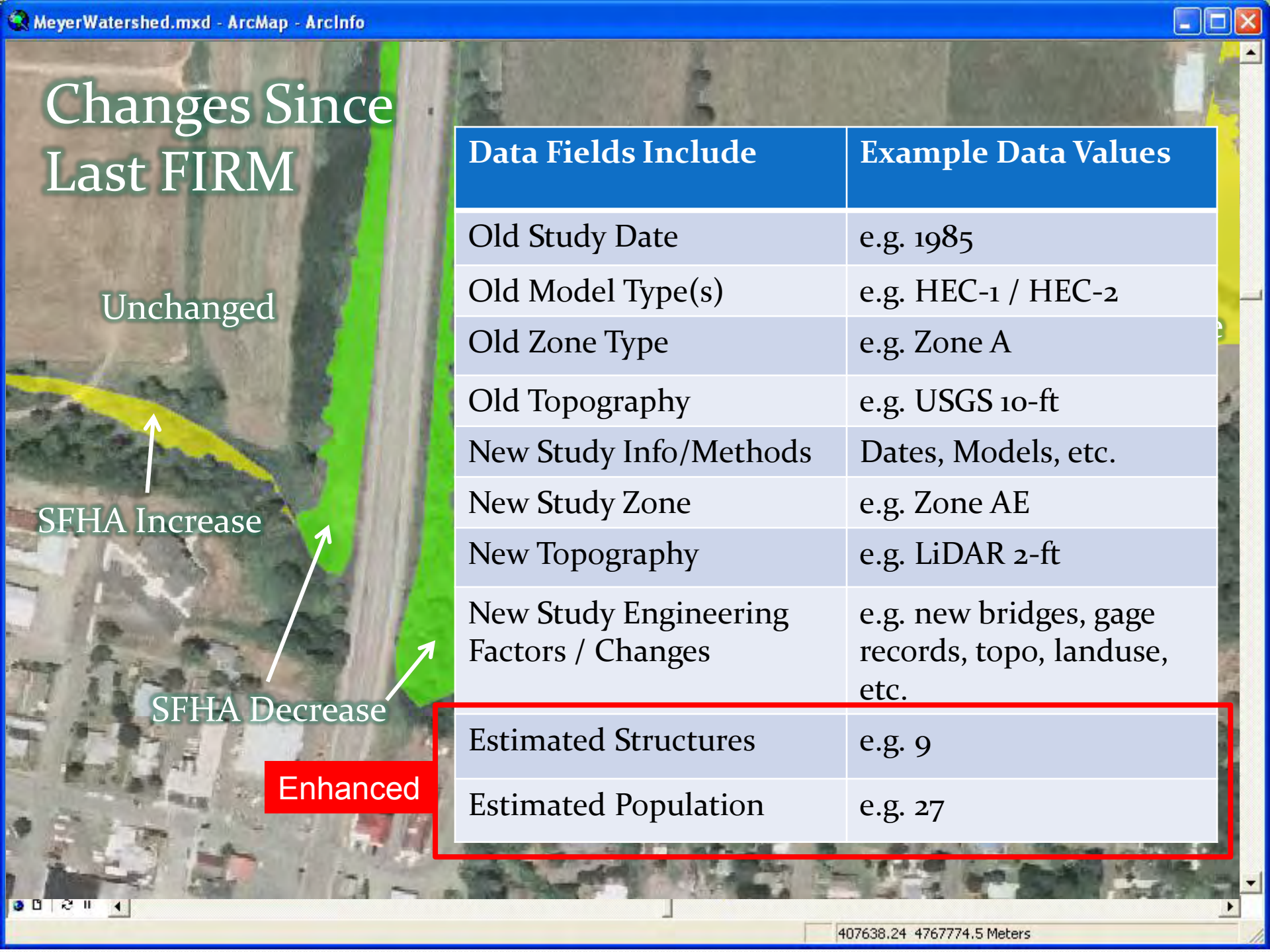
Ad-Hoc Flood Risk Analyses



Flood Risk Report

Changes Since Last FIRM Dataset

- Identify Areas and Types of SFHA Change Between:
  - Current Effective or Previous SFHAs (must be digital)
  - Proposed or New SFHAs
  - Results and/or SFHA Changes are Quantified
- Provide Study/Reach Level Rationale for Changes Including:
  - Methodology and Assumptions
  - Changes of Model Inputs or Parameters (aka Contributing Engineering Factors)
- Offer Stakeholders Transparency and Answers to:
  - Where has my SFHA increased or decreased?
  - Why has my SFHA increased or decreased?
  - Which communities are subject to new BFEs or ordinance adjustments.



Data Fields Include	Example Data Values
Old Study Date	e.g. 1985
Old Model Type(s)	e.g. HEC-1 / HEC-2
Old Zone Type	e.g. Zone A
Old Topography	e.g. USGS 10-ft
New Study Info/Methods	Dates, Models, etc.
New Study Zone	e.g. Zone AE
New Topography	e.g. LiDAR 2-ft
New Study Engineering Factors / Changes	e.g. new bridges, gage records, topo, landuse, etc.
Estimated Structures	e.g. 9
Estimated Population	e.g. 27

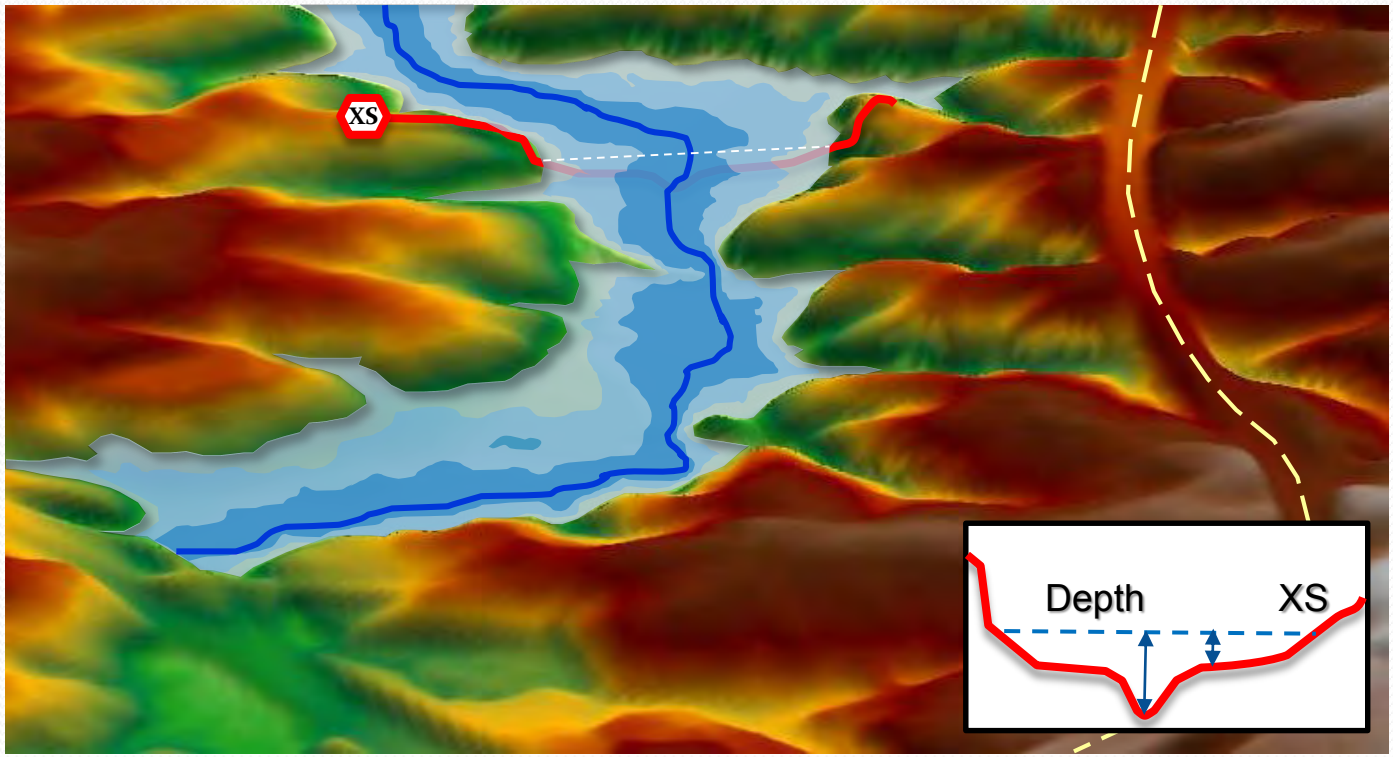
Flood Depth Grids

(Depth_*XX*pct)

- ☑ Base Datasets
  - Riverine: 10%, 4%, 2%, 1%, & 0.2% Annual Chance (A.C.) Floods
  - Coastal: 1% A.C. Flood
  - Levee: 1% A.C. Flood
- ✸ Enhanced Datasets
  - Riverine, Coastal, and Levee: Any depth grid associated to a flood frequency other than those listed above as Base Datasets (e.g. the 2% Coastal depth grid, the 0.5% Riverine depth grid, etc.)

Flood Depth Grids

- Depth Grid Calculated as Difference between WSE and Ground

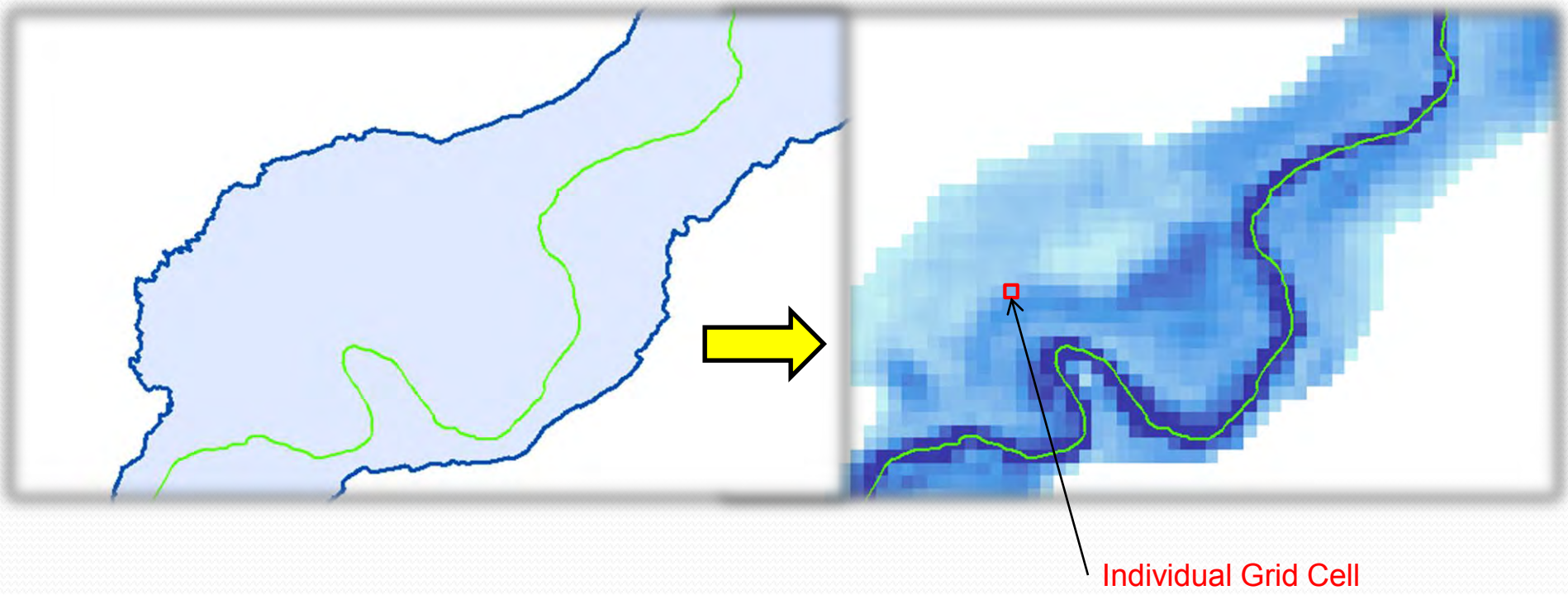


Flood Depth Grids

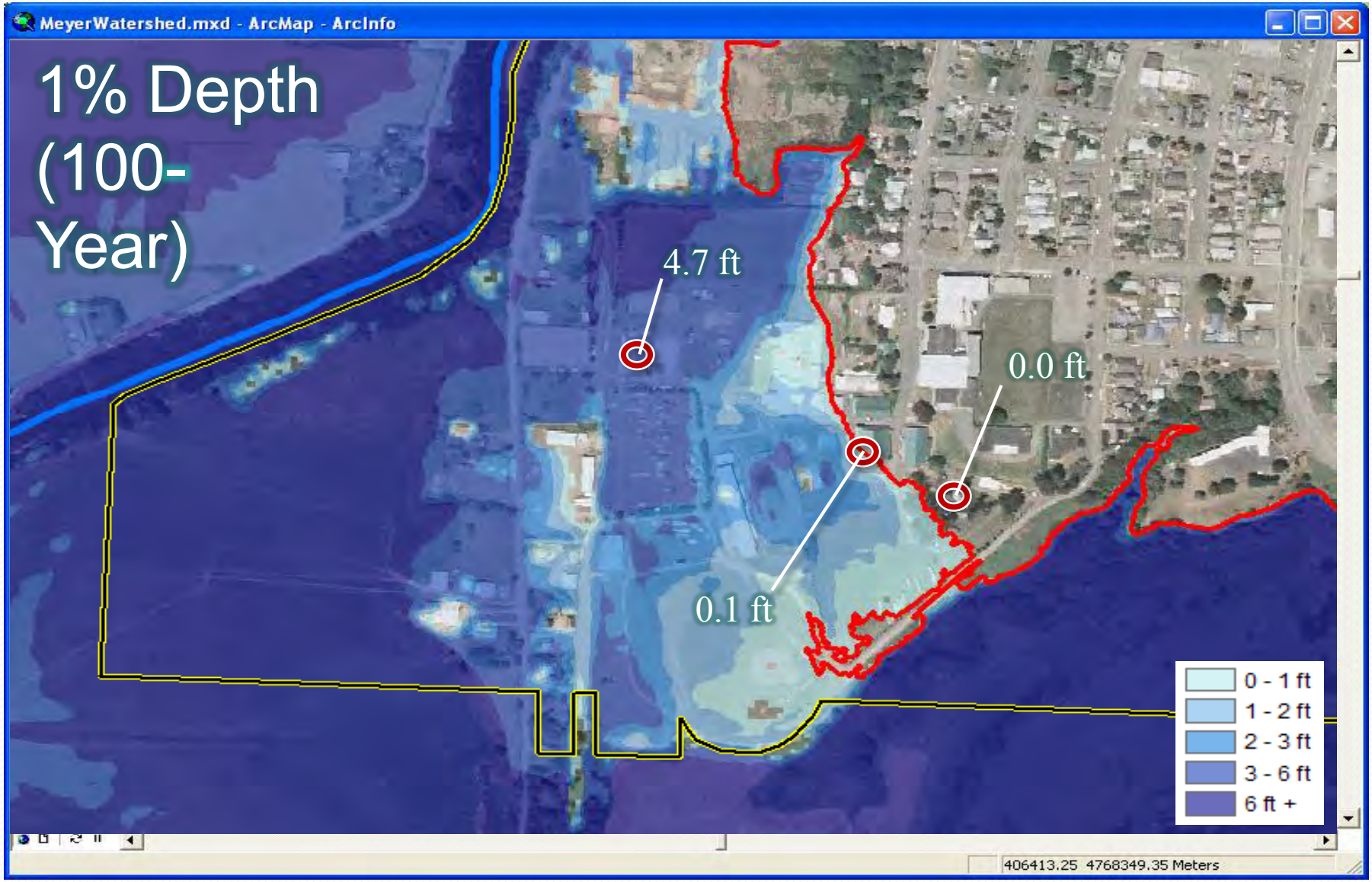
- Each Grid Cell has a Unique Value

FIRM 1% Annual Chance (100-yr) Floodplain

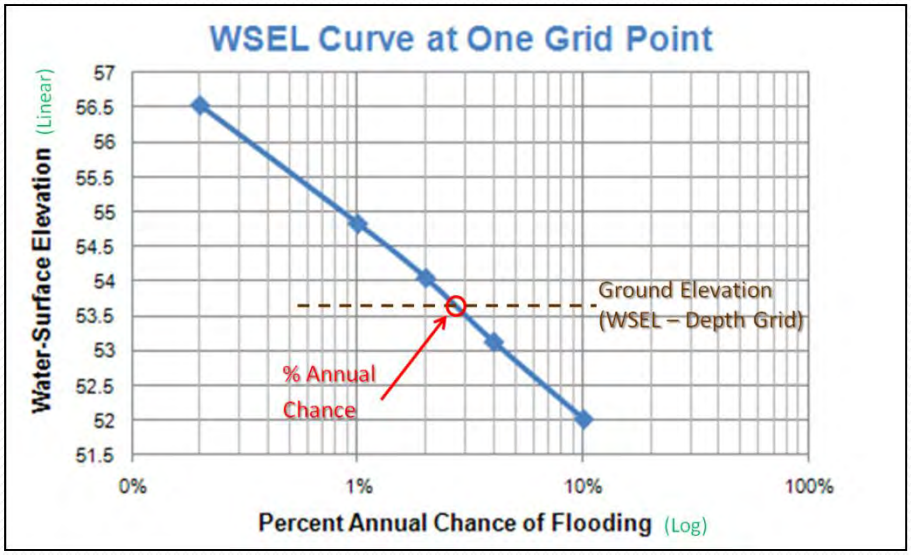
1% Annual Chance Depth Grid

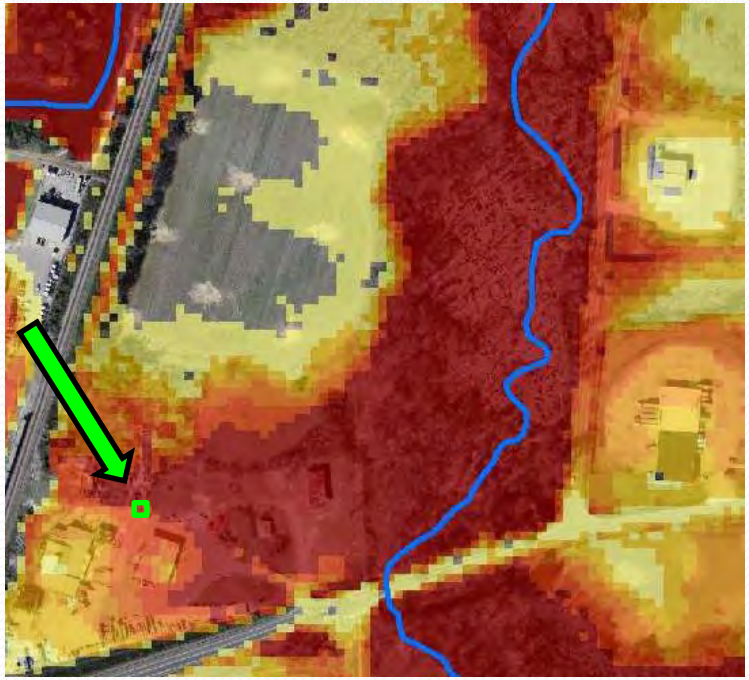


Flood Depth Grids



Percent Annual Chance of Flooding Grid





Flood Velocity Grids (Vel_XXpct)

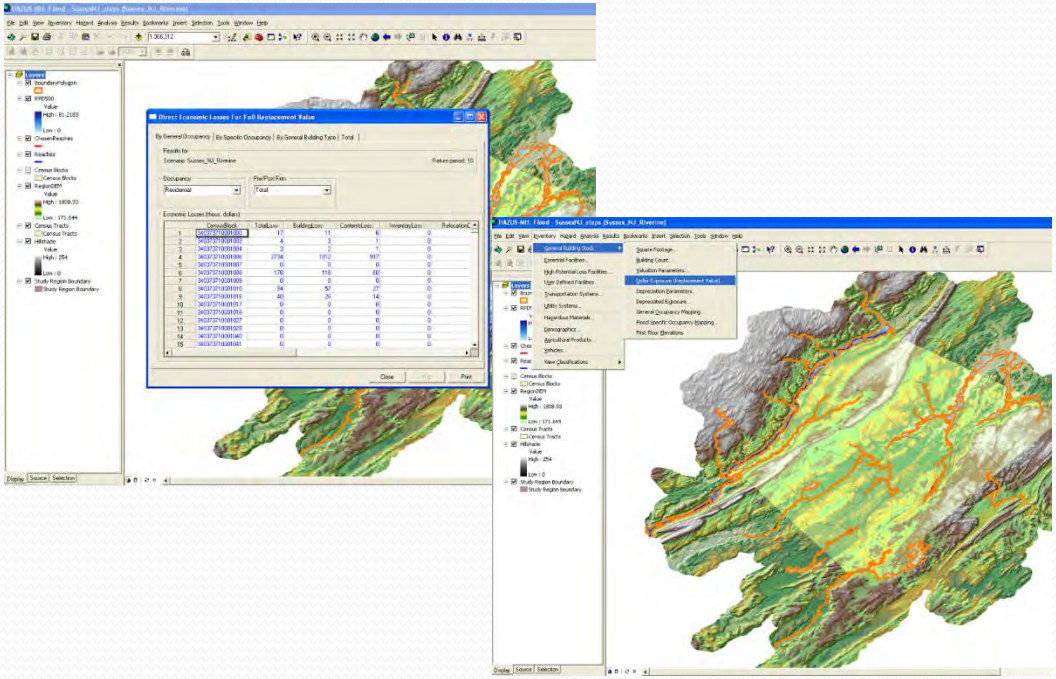
- ✸ Enhanced Datasets
  - All Riverine, Coastal, and Levee Analyses
- Can be generated for both 1-D (e.g. HEC-RAS, etc.) and 2-D (e.g. FLO-2D, etc.) models
- Velocity grid resolution (i.e. cell size) should be equal to that selected for the depth and other grids

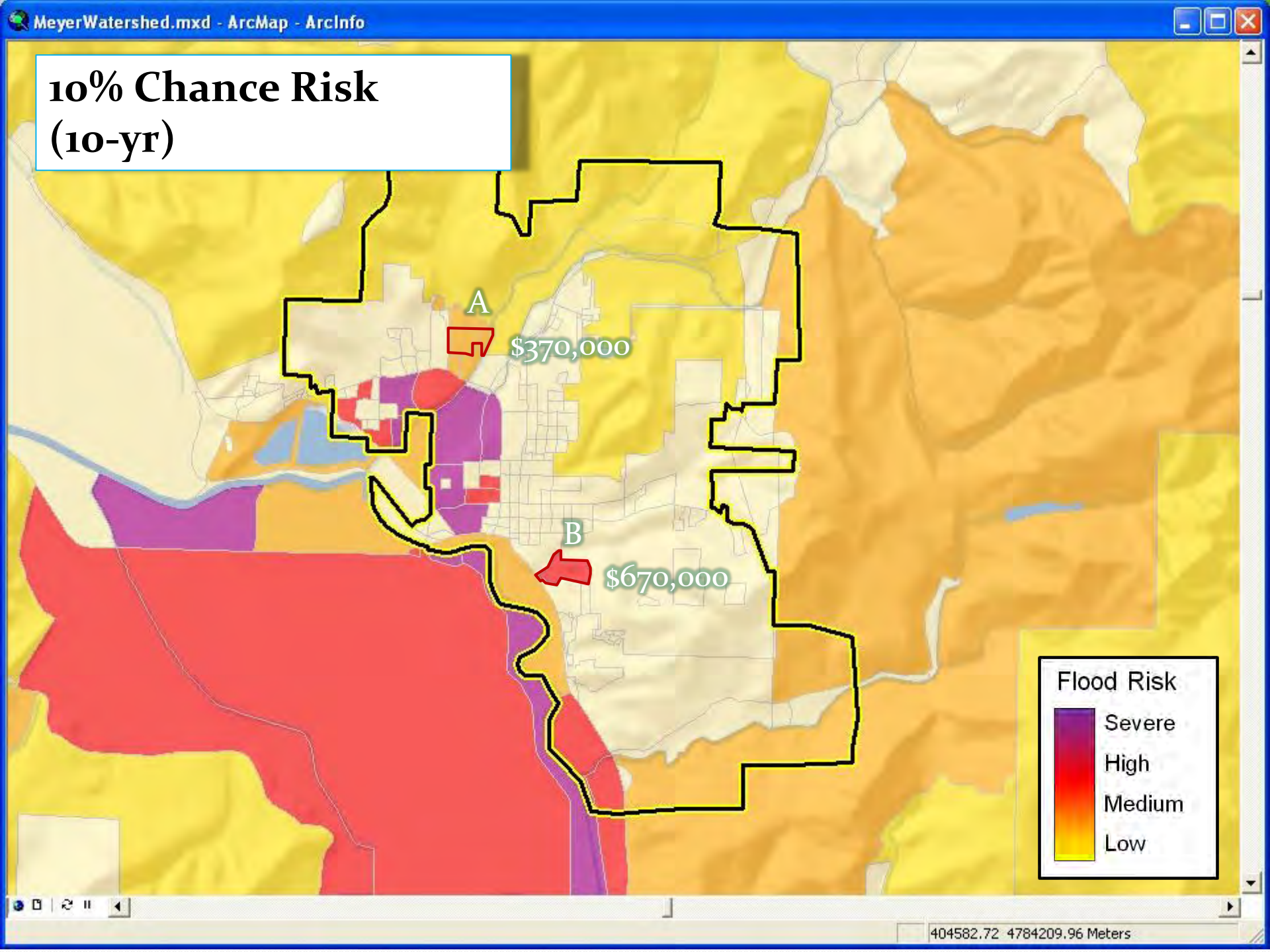
Refined HAZUS Analysis

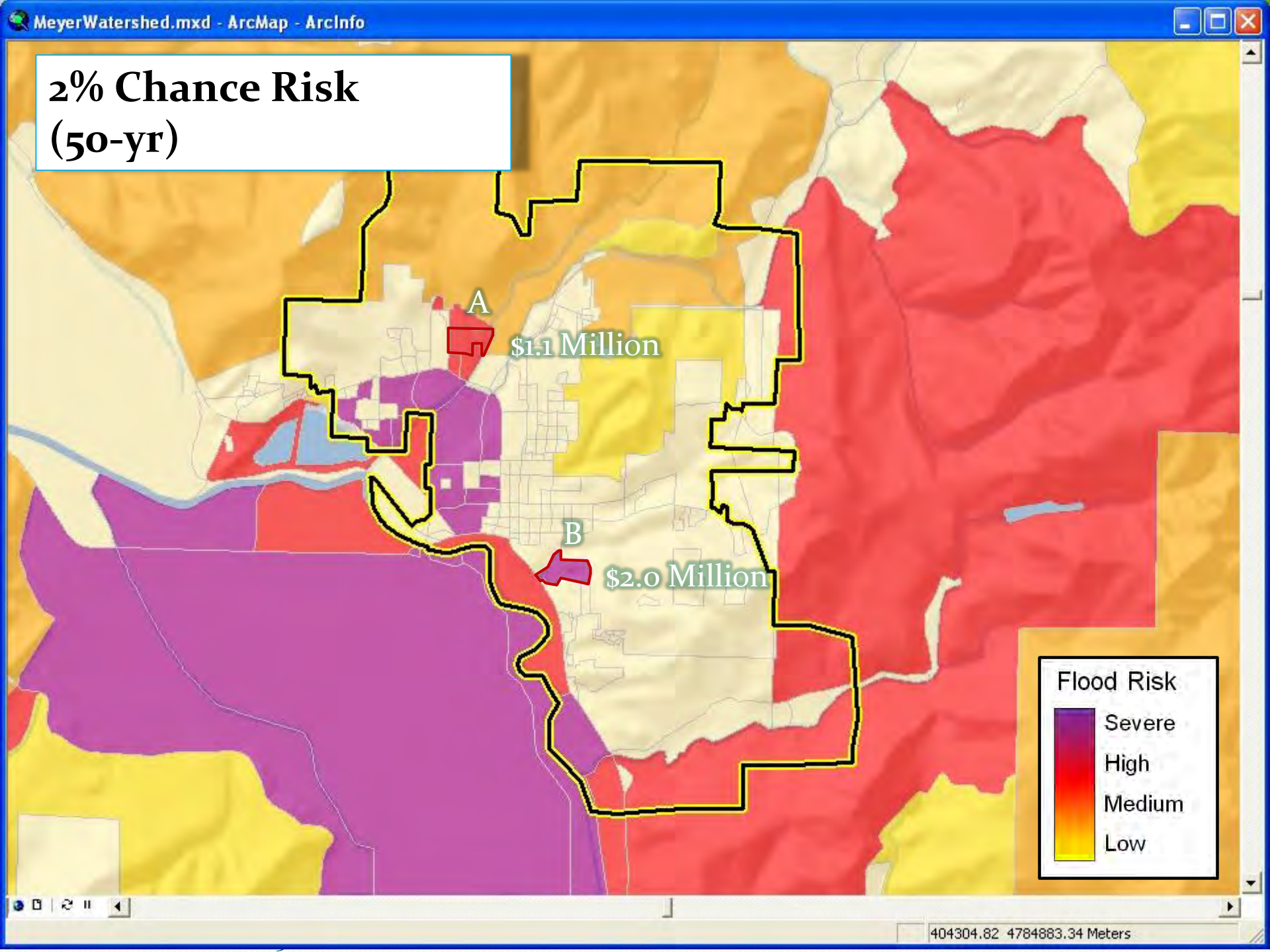
- Overview:
  - Depth Grids imported into HAZUS
  - HAZUS run for each return period and annualized
  - HAZUS results exported and stored in Flood Risk Database

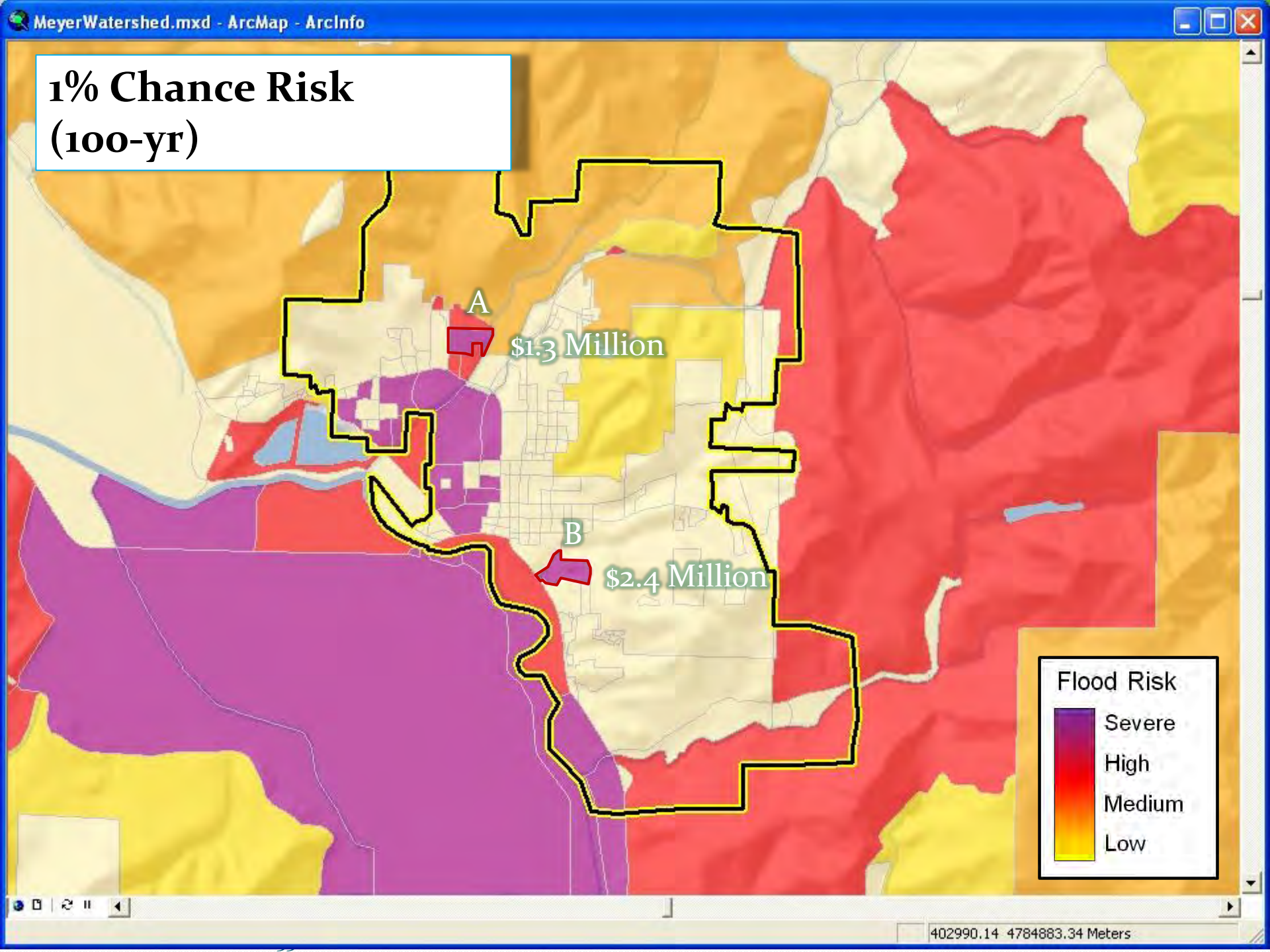
Refined HAZUS -Estimation of Losses

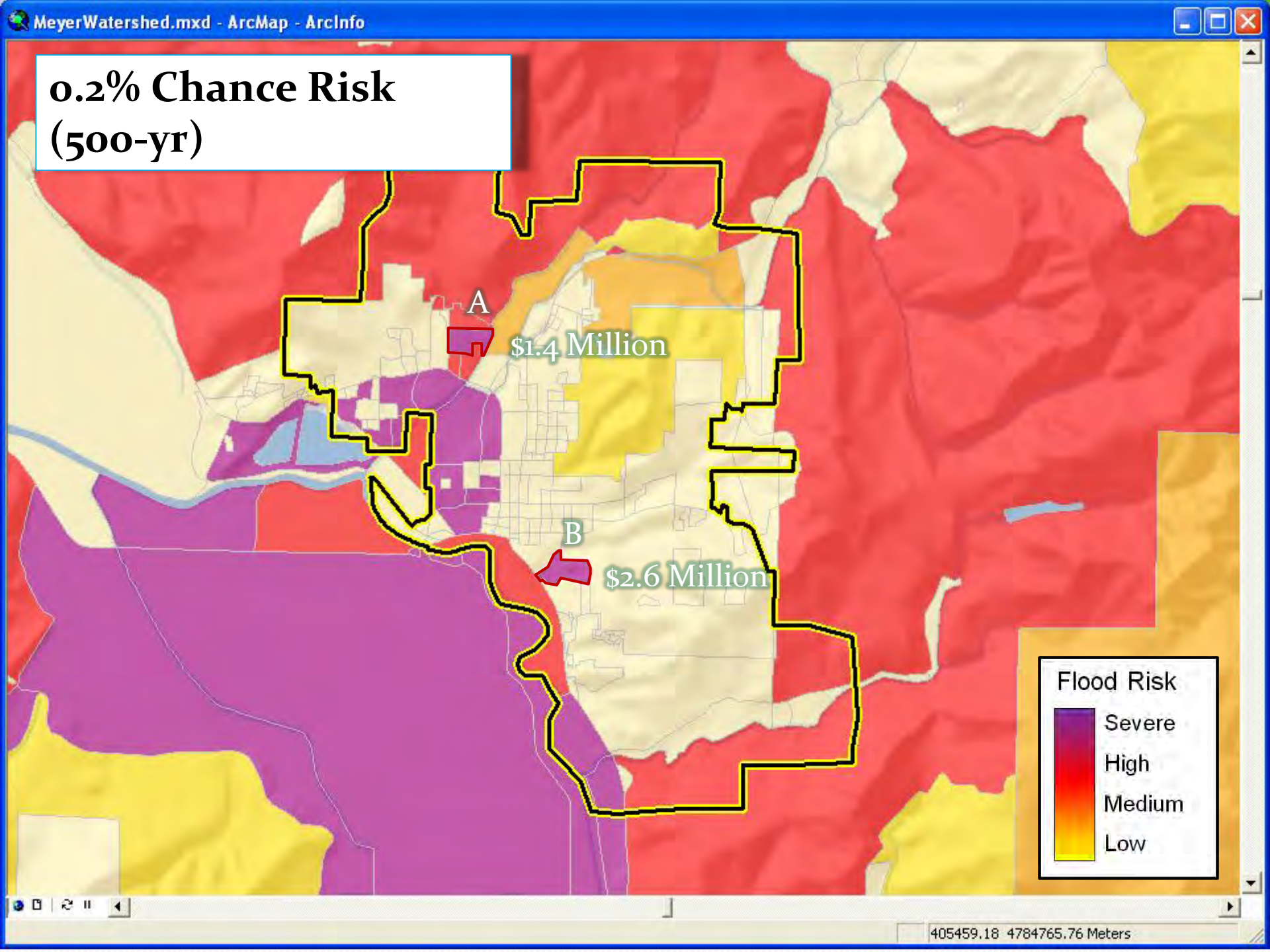
- Dollar Losses
  - Residential Loss
  - Commercial Loss
  - Other Asset Loss
- Percent Damage
  - Evaluates Building Stock
  - Structure and Content Considerations
- Business Disruption
  - Considers Total Occupancy Tables
  - Considers Lost Income and Wages




MeyerWatershed.mxd - ArcMap - ArcInfo
10% Chance Risk
(10-yr)
A
$370,000
B
$670,000
Flood Risk
Severe
High
Medium
Low
404582.72 4784209.96 Meters

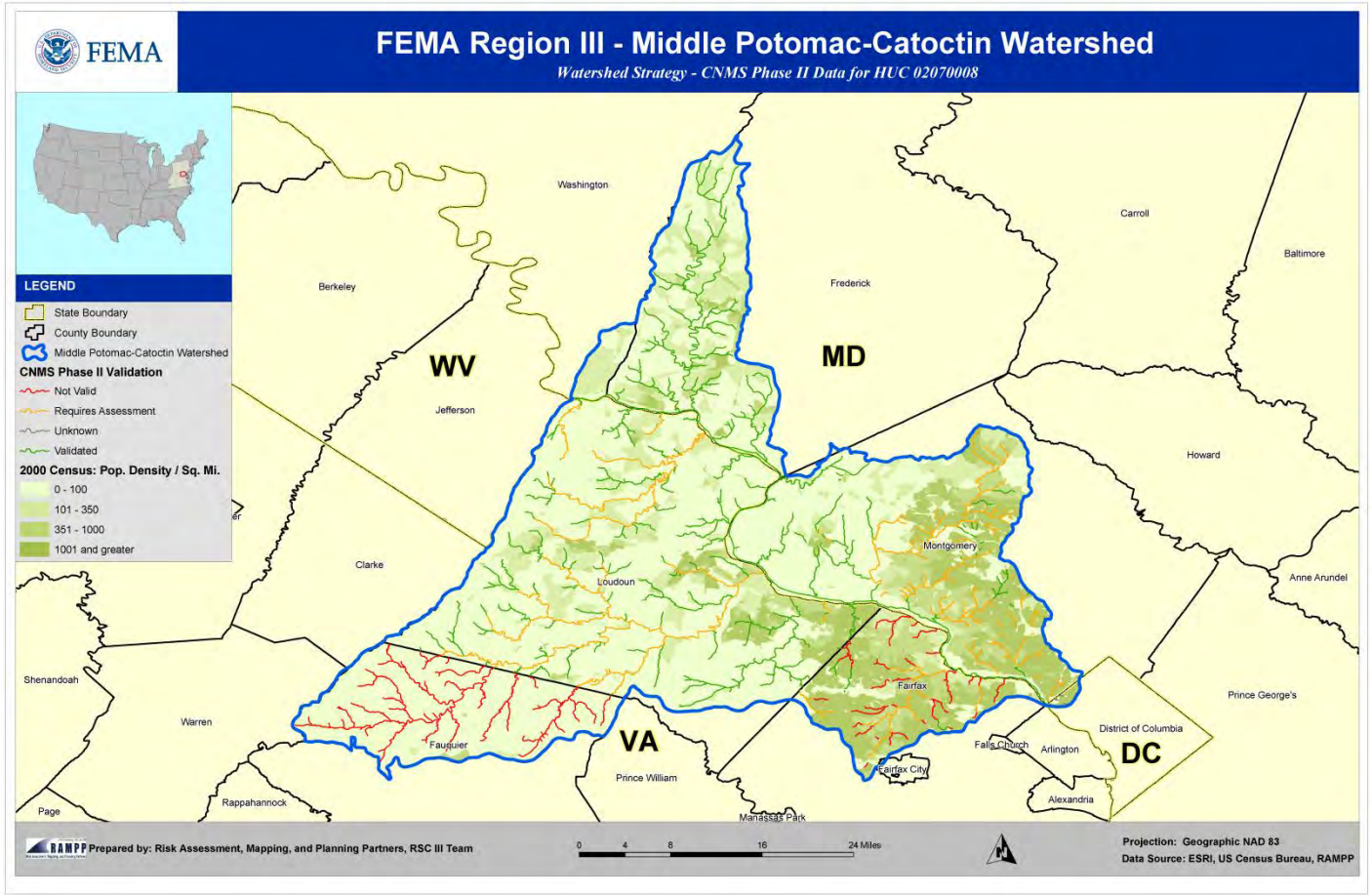

MeyerWatershed.mxd - ArcMap - ArcInfo
2% Chance Risk
(50-yr)
A
$1.1 Million
B
$2.0 Million
Flood Risk
Severe
High
Medium
Low
404304.82 4784883.34 Meters


MeyerWatershed.mxd - ArcMap - ArcInfo
1% Chance Risk
(100-yr)
A
$1.3 Million
B
$2.4 Million
Flood Risk
Severe
High
Medium
Low
402990.14 4784883.34 Meters


MeyerWatershed.mxd - ArcMap - ArcInfo
0.2% Chance Risk (500-yr)
A
$1.4 Million
B
$2.6 Million
Flood Risk
Severe
High
Medium
Low
405459.18 4784765.76 Meters

CNMS - Coordinated Needs Management Strategy

- CNMS as the voice of communities to identify and report mapping needs information to FEMA (replacement for MNUSS)



Overview - Areas of Mitigation Interest

Items that may have an impact (positive or negative) on the identified flood hazards and/or flood risks- Examples include:

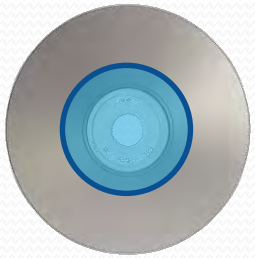
- Community Identified “Hot Spots”
- Previous Claim Areas (e.g. clusters of claim, RL, SRL)
- Riverine and Coastal Flood Control Structures

  (e.g. dams, levees, coastal berms, etc)
- Floodplain “Pinch Points” (e.g. undersized culverts and bridge openings, etc.)
- Significant proposed and recent floodplain development
- Locations of successful mitigation projects

Visualization of
Areas of Mitigation Interest

Flood Risk Database

- **Primary Storage Device for:**
  - Flood Risk Data
- **Stores Data to Create:**
  - Flood Risk Report
  - Flood Risk Map
- **Delivered Digitally to Stakeholders:**
  - CD Delivery



Data Delivered

Flood Risk Database (red = enhanced)

Changes Since Last FIRM

- Horizontal Changes and Results
- Structure/Population counts impacted by change

Depth & Analysis Grids

- Depth (10, 04, 02, 01, 0.2 percent chance)
- Percent Annual Chance
- Percent 30-Year Grid
- Delivery of Water Surface Elevation (multi-freq)
- Water Surface Elevation Change Grid (multi-freq)
- Velocity Grids, Annualized Depth, Top and Toe of Levee
- Multi Freq Grids for Levee and Coastal Areas, etc.

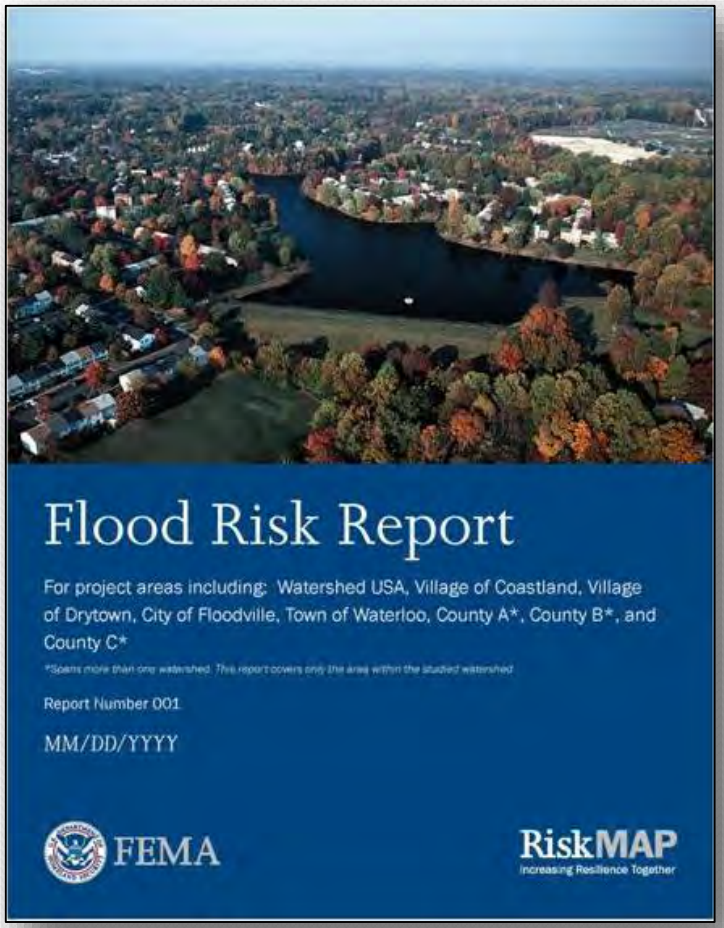
Flood Risk Assessment

- Average Annualized Loss – 2010
- Refined Flood Risk Assessment
- HAZUS or Non-HAZUS with improved data/assumptions

Areas of Mitigation Interest

- Areas of Mitigation Opportunity or Awareness

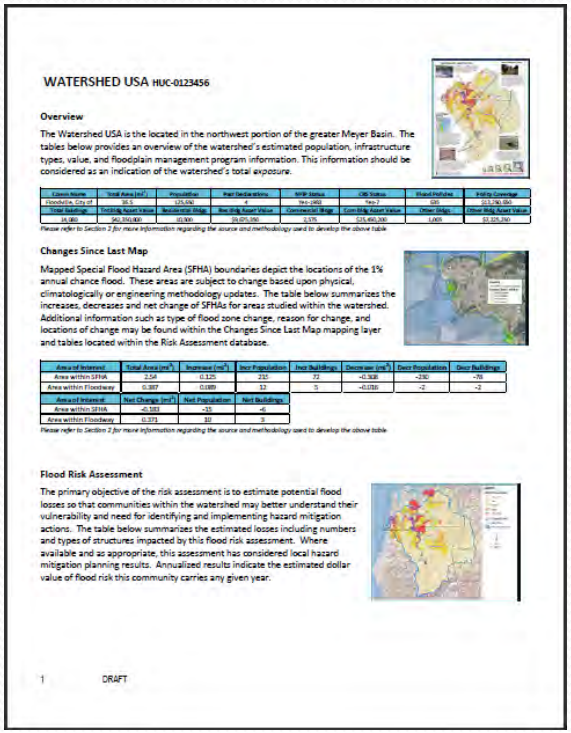
Flood Risk Report



- Background:
  - Purpose, Methods
  - Risk Reduction Practices
- Project Results
  - Changes Since Last FIRM
  - Depth & Analysis Grids
  - Flood Risk Assessment
  - (enhanced analyses)
    - e.g. Areas of Mitigation Interest
- Summarized by Locations
  - Communities and Watersheds

Flood Risk Report – product details

Watershed /Project Level Summary



WATERSHED USA HUC-0123456

Overview

The Watershed USA is the located in the northwest portion of the greater Meyer Basin. The tables below provides an overview of the watershed's estimated population, infrastructure types, value, and floodplain management program information. This information should be considered as an indication of the watershed's total *exposure*.

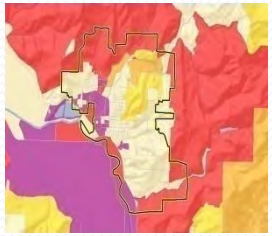
Changes Since Last Map

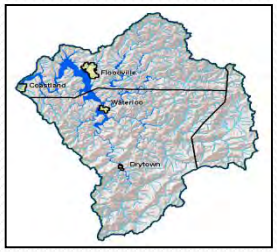
Mapped Special Flood Hazard Area (SFHA) boundaries depict the locations of the 1% annual chance flood. These areas are subject to change based upon physical, climatologically or engineering methodology updates. The table below summarizes the increases, decreases and net change of SFHAs for areas studied within the watershed. Additional information such as type of flood zone change, reason for change, and locations of change may be found within the Changes Since Last Map mapping layer and tables located within the Risk Assessment database.

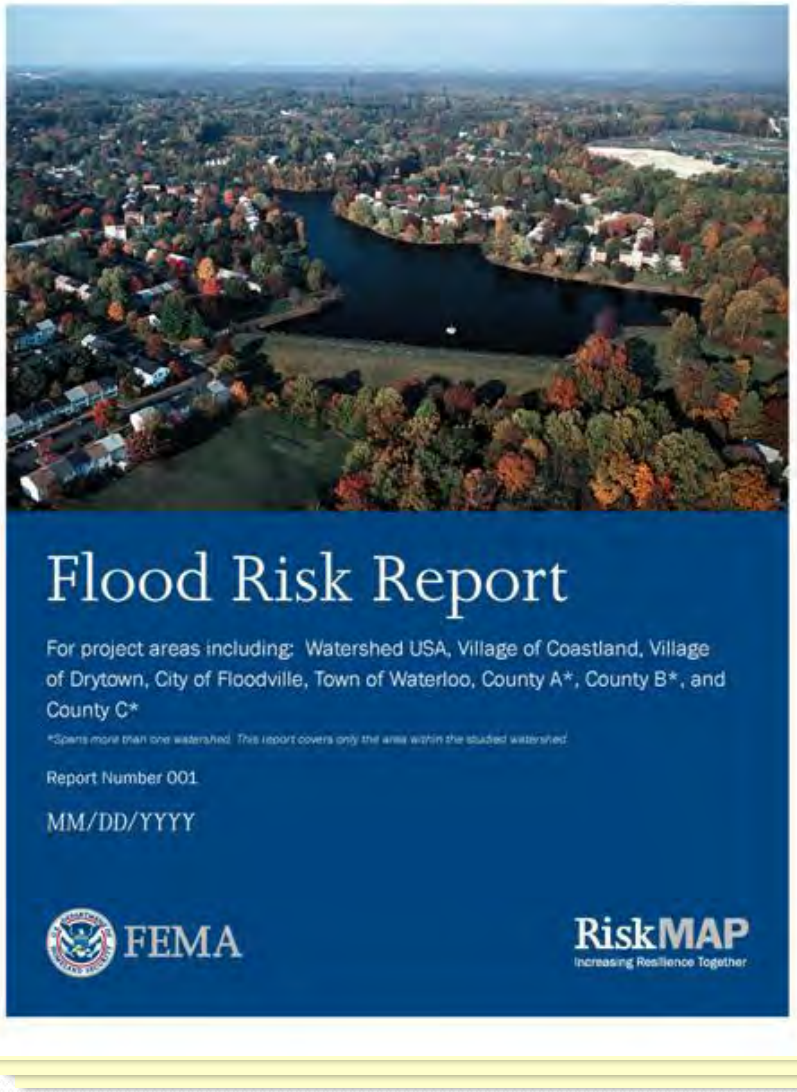
Flood Risk Assessment

The primary objective of the risk assessment is to estimate potential flood losses so that communities within the watershed may better understand their vulnerability and need for identifying and implementing hazard mitigation actions. The table below summarizes the estimated losses including numbers and types of structures impacted by this flood risk assessment. Where available and as appropriate, this assessment has considered local hazard mitigation planning results. Annualized results indicate the estimated dollar value of flood risk this community carries any given year.

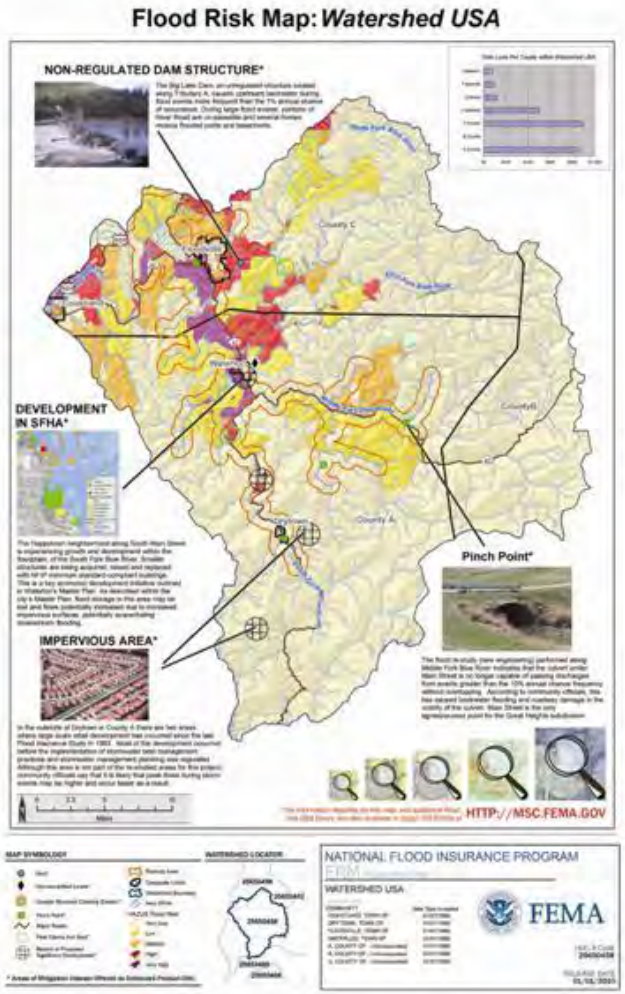
1 DRAFT





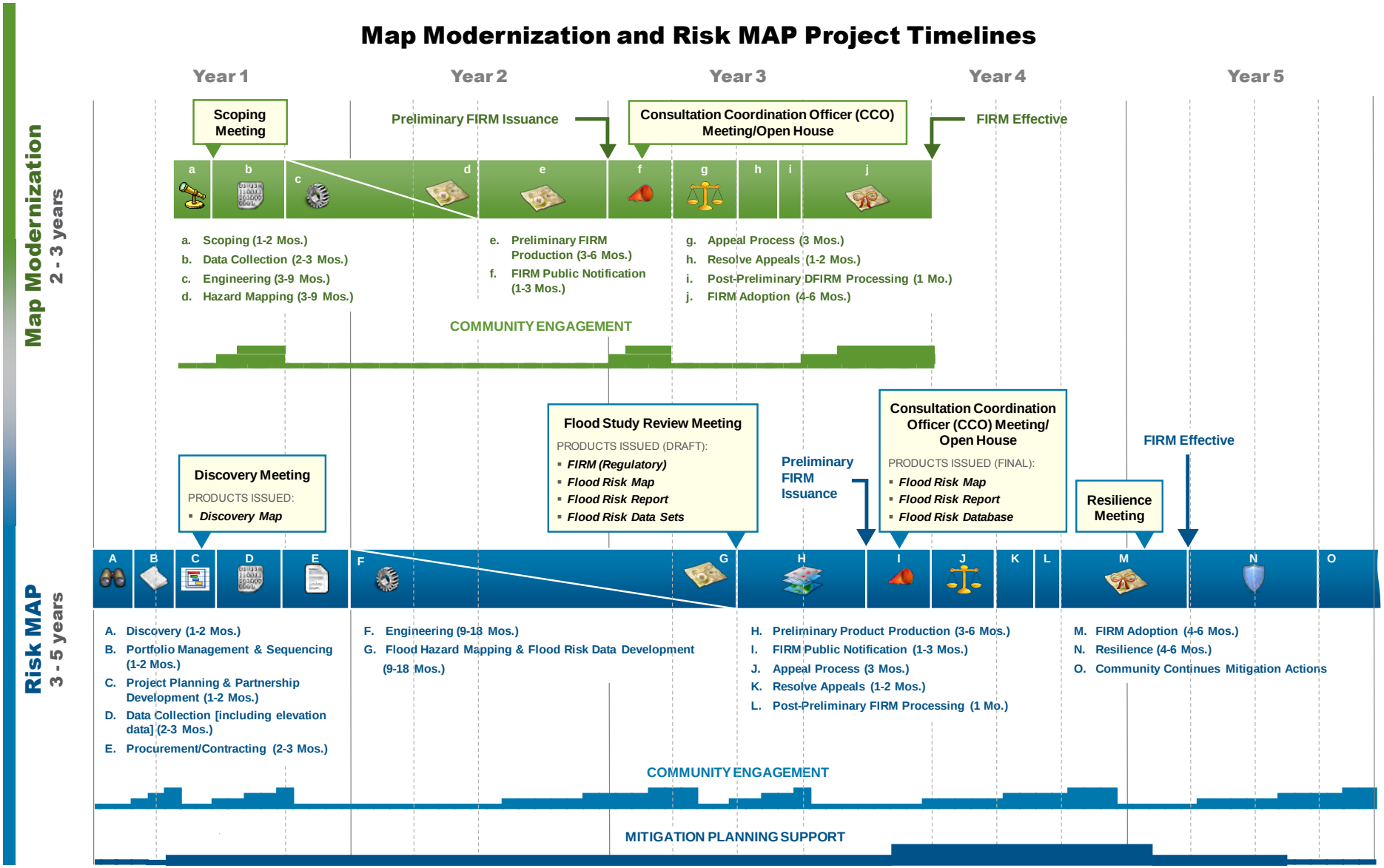


Flood Risk Map



- **Visually Promotes Risk Awareness**
  - Contains results of Risk MAP project non-regulatory datasets
  - Promotes additional flood risk data not shown but located within the Flood Risk Database

Map Modernization and Risk MAP Project Timelines



Opportunities for Data Sharing

- Orthophotography
- Base Map
- Digital Elevation Data
- Non-FEMA Funded Flood Studies
- Digital Flood Boundaries

Example of possible Data Leveraging:

- **FLOOD RISK AND EMERGENCY ACCESS INVESTIGATION FOR BROAD RUN FARMS, LOUDOUN COUNTY, VIRGINIA**

- Prepared for
  Loudoun County Department of General Services

- Prepared by:
  U.S. Army Corps of Engineers
  Baltimore District
  P.O. Box 1715
  Baltimore, Maryland 21203

- OCTOBER 2005

Assessment Data Leveraging

- Examples of Local Data that can be used
  - Essential Facilities
  - Building Counts
  - Highway & RR Bridges
  - Population
  - Water System Facilities
  - Military Installations
  - Location/Categorization and replacement value information

Future Meetings

- Flood Study Review Meeting
  - Review and comment on draft work maps
- Consultation Coordination Office Meeting/Open House
  - Present revised FIRMs, FIS and Risk MAP products
- Resilience Meeting
  - Provide guidance on integrating Risk MAP products into local planning efforts to increase resiliency to natural hazards

Region 3 Contact

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One Independence Mall, 6th Floor
615 Chestnut Street
Philadelphia, PA 19106

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(P) 215-931-5650
(F) 215-931-5501
Robert.Pierson@dhs.gov

Questions?

Everyone who signed the attendance sheet will get a copy emailed to them with all meeting attendees contact info.